

WHAT IS CLAIMED IS:

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1. A method for forming a semiconductor product, comprising the steps of:
providing a semiconductor substrate having an insulating layer formed thereover
and including a top surface;
providing a substructure having a top portion including isolated silicon sections,
each bounded subjacently by horizontal sections of a conductive material and laterally
10 by vertical sections of said conductive material, and a bottom portion formed of a
dielectric film; and
bonding said bottom portion of said substructure to said top surface of said
substrate.
 - 15 2. The method as in claim 1, further comprising forming semiconductor devices at
least one of in and on said isolated silicon sections.
 3. The method as in claim 2, wherein said semiconductor devices formed in a first
20 plurality of said isolated silicon sections combine to form an integrated circuit.
 4. The method as in claim 3, further comprising generally enclosing a group of said
first plurality of isolated silicon sections with conductive materials.
 - 25 5. The method as in claim 4, in which said step of generally enclosing includes
forming insulating materials over said group of isolated silicon sections, forming a
conductive cover layer over said insulating materials and forming side conductive
materials extending from said conductive cover layer to said vertical sections which
peripherally surround said group,
30 said conductive material, said conductive cover layer and said side conductive
materials combining to electromagnetically shield said group.
 6. The method as in claim 1, further comprising the step of generally enclosing at
least some of said individual isolated silicon sections with conductive material.

5 7. The method as in claim 6, in which said step of generally enclosing includes, for each isolated silicon section being enclosed, forming insulating materials over said isolated silicon section, forming a conductive cover layer over said insulating materials and forming side conductive materials extending from said conductive cover layer to said vertical sections which bound said isolated silicon section;

10 said conductive material, said conductive cover layer and said side conductive materials combining to electromagnetically shield said isolated silicon section.

15 8. The method as in claim 7, in which said step of forming said insulating materials includes, for each isolated silicon section being enclosed, forming a succession of insulating layers and forming trenches in each of said succession of insulating layers, said trenches extending along the periphery of said isolated silicon section, and filling said trenches with said side conductive materials.

20 9. The method as in claim 7, in which said horizontal sections of conductive material, said vertical sections of said conductive material, said conductive cover layer and said side conductive materials are each formed of tungsten.

25 10. The method as in claim 7, in which said step of forming insulating materials includes, for each isolated silicon section being enclosed, forming a succession of insulating layers and said step of generally enclosing includes forming one of a continuous opening and a linear array of spaced openings in each of said succession of insulating layers above said vertical sections which bound said isolated silicon section, and filling said formed corresponding openings with said side conductive materials.

30 11. The method as in claim 1, in which said semiconductor substrate and said substructure each include substantially the same lateral dimensions and shape.

35 12. The method as in claim 1, in which said step of providing said substructure includes providing a further substrate having said substructure formed in overturned position as a top portion thereof and further comprising the step of separating said substructure from other portions of said further substrate.

5 13. The method as in claim 12, in which said step of separating takes place after said step of bonding.

14. The method as in claim 12, in which said step of separating comprises one of backgrinding and etching.

10 15. The method as in claim 12, in which said step of providing said substructure includes providing said further substrate having a top surface, implanting hydrogen into an upper region of said further substrate, said upper region including a subjacent boundary, forming trenches within said upper region and extending vertically downward from said top surface, forming said conductive material over said top surface and filling said trenches, and forming said dielectric film over said conductive material thereby forming said substructure in overturned position as a top portion of said further substrate, and

15 said step of separating includes separating said substructure from other portions of said further substrate along a crack propagated along said subjacent boundary.

20 16. The method as in claim 15 in which said step of separating includes heating to a temperature within the range of 400°C to 600°C.

25 17. The method as in claim 15, further comprising the step of planarizing after said step of forming said conductive material over said top surface of said further substrate and filling said trenches, and prior to said step of forming said dielectric film.

18. The method as in claim 1, in which said step of bonding comprises hydrophilic bonding.

30 19. The method as in claim 1, wherein said vertical sections of said conductive material and said horizontal sections of said conductive material each comprise tungsten.

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5 20. The method as in claim 1, wherein said insulating layer comprises a silicon dioxide layer and said dielectric film comprises a silicon dioxide film and said step of bonding includes hydrophilic bonding.

10 21. The method as in claim 5, in which said side conductive materials are not continuous and include openings therethrough, and further comprising forming interconnect leads extending through said openings.

22. The method as in claim 7, in which said side conductive materials are not continuous and include openings therethrough, and further comprising forming interconnect leads extending through said openings.

15 23. A semiconductor product including:
a semiconductor substrate, and
silicon islands formed over said semiconductor substrate and including
semiconductor devices formed thereon, each of said silicon islands surrounded
20 peripherally and subjacently by a conductive material.

24. The semiconductor product as in claim 23, in which said conductive material is tungsten, W.

25 25. The semiconductor product as in claim 23, in which said conductive material is disposed over an insulating layer disposed over a silicon substrate.

30 26. The semiconductor product as in claim 23, in which said semiconductor product comprises an integrated circuit and at least one of said silicon islands includes an analog circuit formed thereon and at least one of said silicon islands includes a digital circuit formed thereon.

35 27. The semiconductor product as in claim 26, in which at least one of said silicon islands including an analog circuit formed thereon is covered by a conductive cover capable of suppressing electromagnetic radiation from traveling therethrough, and at least one of said silicon islands including a digital circuit formed thereon is covered by

5 a conductive cover capable of suppressing electromagnetic radiation from traveling
therethrough.

10 28. The semiconductor product as in claim 23, in which said semiconductor product
comprises an integrated circuit and at least one of said silicon islands is covered by a
conductive cover capable of suppressing electromagnetic radiation from traveling
therethrough.

15 29. The semiconductor product as in claim 28, wherein said electromagnetic shield
comprises a top conductive layer formed over said corresponding silicon island and
conductive materials extending from said top conductive layer to said conductive
material which peripherally surrounds said silicon island.

20 30. The semiconductor product as in claim 23, in which said semiconductor product
comprises an integrated circuit and each of said silicon islands is covered by an
electromagnetic shield including a top conductive layer formed over said corresponding
silicon island and conductive sidewalls extending from said top conductive layer to said
conductive materials which peripherally surround said corresponding silicon island, said
conductive sidewalls including at least one opening therethrough, and further
25 comprising at least one conductive interconnect lead extending through said at least
one opening and for providing electrical connection to said semiconductor devices
formed on said corresponding cover.

30 31. An integrated circuit device having a first group of transistors formed in a first
region of a substrate and a second group of transistors formed in a second region of
said substrate, and in which said first group is electromagnetically shielded from said
second group.

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